



U.S. Environmental Protection Agency, Region III
NPDES Enforcement Branch
1650 Arch Street
Philadelphia, PA 19103

**COMBINED SEWER SYSTEM
COMPLIANCE INSPECTION AND
ASSESSMENT OF NINE MINIMUM CONTROLS**

**CITY OF LANCASTER,
PENNSYLVANIA**

INSPECTION REPORT

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ATTACHMENTS

Attachment 1: Photo Log from December 5, 2011

Attachment 2: Photo Log from December 6, 2011

Attachment 3: Photo Log from December 7, 2011

Attachment 4: City of Lancaster Inspection Photos from December 5, 2011

Attachment 5: City of Lancaster Inspection Photos from December 6, 2011

Attachment 6: City of Lancaster Inspection Photos from December 7, 2011

Attachment 7: Documents Obtained During the Inspection December 6 – 7, 2011

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City of Lancaster, Pennsylvania

I. INTRODUCTION

Mr. Maslowski and Ms. Zieba arrived at the City of Lancaster (City or Lancaster) Advanced Wastewater Treatment Plan (AWTP) at 08:00 hours on December 6, 2011, where they presented their credentials to Charlotte Katzenmeyer, Douglas Connell, and Bryan Harner. EPA stated that this inspection was a follow-up to the September 2011 inspection.

The following personnel were involved in the inspection:

City of Lancaster Representatives:	Charlotte Katzenmeyer, Director of Public Works Douglas Connell, Utility Manager Bryan Harner, Wastewater Project Manager Mark Leonard, Wastewater Quality Supervisor Terry Dickel, Operations Supervisor Ed Mastromatyeo, Maintenance Supervisor Chris Brosey, Electrical/Mechanics Supervisor
Pennsylvania Department of Environmental Protection Representatives:	Shawn Arbaugh, Water Quality Specialist Supervisor Summer Lee Kunkel, Environmental Protection Compliance Specialist
EPA Representatives:	Steve Maslowski, EPA Region 3 Kyle Zieba, EPA Region 3

II. BACKGROUND INFORMATION

The tributary sewer authorities and municipalities include:

- Lancaster Area Sewer Authority (LASA)—(1) East Petersburg Borough, (2) East Hempfield Township, (3) Lancaster Township, (4) Manheim Township, (5) Manor Township, (6) Mountville Borough, and the (7) West Hempfield Township
- East Lampeter Sewer Authority (ELSA)—(8) East Lampeter Township
- Suburban Lancaster Sewer Authority (SLSA)—(9) West Lampeter Township, (10) Pequea Township, and the (11) Borough of Strasburg
- Leola Sewer Authority (LSA)—(12) Upper Leacock Township, and (13) portions of West Earl Township.

The City's WWTP consists of two distinct treatment trains, the North and South Treatment Trains. The City's Wastewater Project Manager, Mr. Bryan Harner, stated that the total design flow rate for the City's WWTP is 32.08 million gallons per day (MGD) and the average daily flow is about 17 MGD. He added that the limiting factor for the WWTP's treatment capacity is nitrogen removal, which limits the WWTP to a maximum discharge of 26 MGD.

The City's Permit authorizes discharges from the WWTP, as well as five diversion chambers in the collection system (i.e., CSOs 002–006) and a bypass of secondary treatment from the WWTP's South Treatment Train (i.e., CSO 100). The permitted bypass from the WWTP allows the City to discharge disinfected primary effluent from the South Treatment Train to the Conestoga River. The actual outfall location for CSO 100 is the same as the outfall for the WWTP, outfall 001. Partially treated bypass wastewater flows from the WWTP and then combines with the fully treated wastewater prior to reaching the Conestoga River.

The City's sewer system consists of about 88 miles of combined sewer pipe and 60 miles of separate sanitary sewer pipe. The City owns, operates, and maintains eight pump stations—Engleside (Main Pump Station), North, Stevens Avenue, Susquehanna, Conestoga Gardens, Maple Grove, Grofftown, and Sunnyside—and has been contracted to operate and maintain 13 pump stations owned by the SLSA. The City's pump stations are connected to its supervisory control and data acquisition (SCADA) system and can be monitored remotely from the WWTP.

The City has identified four distinct “sewer districts” within the combined sewer area—Engleside (1.6 square miles), North (1.4 square miles), Stevens Avenue (0.2 square mile), and Susquehanna (0.1 square mile). According to the City Wastewater Project Manager, the North and Engleside sewer districts account for about 95 percent of CSO volume discharged from the City's system.

III. INSPECTION SUMMARY

- The City of Lancaster lacks solids and floatable controls for CSO diversion chambers at Engleside (CSO 002), Susquehanna (CSO 003), Clay Street (CSO 005), and Strawberry (CSO 006).
 - Grit removal system on North Pump Station is inadequate for combine collection system. This has a direct impact on primary clarifier in North Treatment Train at the AWTP. The clarifiers have to provide primary treatment and are also required to remove grit.
 - Skimmer arm on primary clarifier (tank #5) on North Treatment Train needs to be repaired, which further stresses treatment at AWTP.
 - 16 new SOPs for the collection system operation have been recently developed since the last inspection in September.
 - Lancaster has had seven DWOs since September 2009, totaling more than 14.8 million gallons. Lancaster does not include a determination of the impact to the environment and procedures for calculation of spill/release volume and time frame of the DWO or sanitary sewer overflow event.
 - Lancaster needs to evaluate the amount of MS4 flow to the North pump station from Manheim Township and eliminate it to reduce the volume and frequency of CSO overflows, maximize flow to the WWTP, and maximize storage in the collection system.
 - Lancaster needs to eliminate the discharge of groundwater from the school district that goes to the North Pump Station. Like the MS4 flow from Manheim, this is a Nine Minimum Control violation and needs to be eliminated from the collection system.
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IV. ASSESSMENT OF NINE MINIMUM CONTROL IMPLEMENTATION

Part C, Subsection V. of Lancaster's NPDES permit requires documentation of continued implementation of the Nine Minimum Controls (NMCs).

A. NMC #1: Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs

The Permit states that approximately six miles of pipe are to be inspected annually. Complete inspection of collection system will be completed by 2013.

The inspection began with a discussion, EPA asked the City if they were going to be able to meet the permit goal of inspecting the complete collection system. Mr. Connell felt confident they will meet the goal by 2013 by using a City crew and a contractor. He said they are developing a list of grouting and pipe lining projects. The City will have to contract out the large projects.

EPA asked about tracking "hot spots" within the collection system. Mr. Harner stated that the hot spots are inspected and cleaned if necessary once a quarter. The list has grown over the past eight years when it was first developed. "Hot Spots" can be caused by root issues, clogged sewer lines, grease build up, etc. After cleaning the sewer line the City will go back and CCTV the line. The City has increased maintenance and support activities to hot spot areas and replaced sewer lines in trouble. The City provided a list of capital improved projects that are expected to be completed by 2014.

EPA asked about routing of calls concerning backups, blockages, sewer overflows, CSOs, and spills/releases from the general public. According to the Lancaster staff, citizens may call in a complaint to an operator that is on duty 24 hours a day, seven days a week. This information is forwarded to a manager on the call list, who makes the decision to dispatch a field crew. Mr. Harner stated that the City is developing a computer management system (CMS) that is expected to track all complaints. Also, Lancaster is drafting a standard operating procedure (SOP) for tracking and responding to citizen complaints. The SOP will include information source, date and time of call, number of calls transferred to sewer authority from police, fire, hazardous materials, and etc. Also, include in the SOP the time for calls to be fielded by the proper personnel, required time frames, and quality assurance and quality control to ensure goals are met.

B. NMC #2: Maximum Use of the Collection System for Storage

The City has a permit requirement to use closed-circuit television (CCTV) to inspect at least 6 miles of sewer line per year. Accordingly, the City uses a contractor, Pipe Data, to conduct its CCTV activities for satisfying this permit requirement. According to City staff, these contracted activities are documented on the associated purchase orders.

Lancaster needs to evaluate the amount of MS4 flow to the North pump station from Manheim Township and eliminate it to reduce the volume and frequency of CSO overflows, to maximize storage in the collection system.

Lancaster needs to eliminate the discharge of groundwater from the school district that goes to the North Pump Station. Like the MS4 flow from Manheim, this is a Nine Minimum Control violation and needs to be eliminated from the collection system, because this does not maximize storage in the collection system.

C. NMC #3: Review and Modification of Pretreatment Requirements to Assure CSO Impacts are Minimized

The City has experienced issues with cloth materials being discharged to the sewer system from the Lancaster County Prison, including impacts on the primary clarifiers in the City's North Treatment Train. Based on the observation of cloth materials on equipment in the North Pump Station during the September 2011 inspection, the sources of rags might be other areas of the City in addition to the prison. EPA wanted to know what actions were taken to prevent debris from being discharged to the collection system. In 2010 Lancaster had issued an Administrative Order to the County Prison that required barscreen to be installed to prevent the formation of the obstruction in the City's sewer collection system and North sewage pumping station. At the time of the inspection the barscreen had not been installed. The prison was waiting for fabrication of the barscreen.

Lancaster has 18 significant industrial users (SIUs), five of which are located in the combined collection system, 30 none category industrial users, 16 none significant users, and seven groundwater discharges to the collection system. According to Ms. Katzenmeyer, the industrial flow over the years has decreased to 3% of the total flow to the AWTP. All five sewer authorities have adopted pretreatment ordinances, but not all of the townships in the authorities have adopted ordinances.

Lancaster sent out letters to SIUs requesting they do not discharge during wet weather events, but this is not mandatory. According to Mr. Leonard, Lancaster conducts annual inspections of all the SIUs. In addition to the order to the County Prison, the City issued an order against Lancaster Oil for \$60,000 for a release of a batch discharge of oil and grease into the collection system that violated the local limits. Mr. Leonard stated that the oil and grease creates scum on the North clarifiers and causes problems with the oxidizer, but hasn't caused pass through interference. EPA asked what triggers an enforcement action. Mr. Leonard stated that significant noncompliance over six rolling quarters and historical issues will trigger an enforcement action. Also, Lancaster will take action with surcharges of BOD, TSS, oil and grease. EPA stated that Lancaster should make sure they follow its Enforcement Response Plan in its NPDES permit. EPA asked if there was any coordination with the local health department to regulate and permit restaurants. Mr. Leonard stated that Lancaster coordinates and communicates with the health department to control the release of oil and grease into the collection system.

As stated by Mr. Leonard, oil and grease causes problems with the North Treatment Train primary clarifiers and at the time of the inspection one of the clarifiers was out of service for several months. Also, North Treatment Train does not have grit removal system. All of which stresses the AWTP treatment ability; especially during wet weather.

D. NMC #4: Maximization of Flow to the Publicly Owned Treatment Works for Treatment

The City has not scheduled maintenance activities for its primary clarifiers in the North Treatment Train in a way that would maximize flows to the plant for treatment. For example, the City took one of its two primary clarifiers offline during the extreme wet weather event that occurred during September 5–8, 2011. According to City staff, the primary clarifier had not been cleaned for about four years prior to this cleaning activity. Based on discussions with City staff, there appears to be a lack of preventive maintenance activities and documentation concerning the performance of the primary clarifiers.

Lancaster needs to evaluate the amount of MS4 flow to the North pump station from Manheim Township and eliminate it to reduce the volume and frequency of CSO overflows, maximize flow to the WWTP.

Lancaster needs to eliminate the discharge of groundwater from the school district that goes to the North Pump Station. Like the MS4 flow from Manheim, this is a Nine Minimum Control violation and needs to be eliminated from the collection system, because this does not maximize flow to the WWTP.

E. NMC #5: Elimination of CSOs during Dry Weather & Sanitary Sewer Overflows

Lancaster has had at least seven dry weather overflows (DWOs) since September 2009, totaling more than 14.8 million gallons. The PADEP issued a Consent Assessment of Civil Penalty on December 21, 2009, and May 22, 2012 for the DWOs for a total penalty of \$63,099.

EPA asked Lancaster what corrective actions were taken to evaluate sewer overflows and spill release events. Lancaster replied they completed a root cause analyses of spill events. In September 2011 there was a sanitary sewer over (SSO) at the Conestoga Garden Pump Station that was determined to be a result of employee error. Mr. Harner stated that the City conducted a route cause analysis and determined the spill was caused by an employee error and procedures were changed to prevent spills in the future. EPA requested a copy of the spill report and asked what the employee error that caused the spill. Lancaster failed to answer EPA's question and did not provide a copy of the spill report.

F. NMC #6: Control of Solid and Floatable Materials in CSOs

The conversation started with a discussion about solids and floatables controls installed in the combined sanitary system (CSS) and combined sewer outfalls (CSOs). According to Mr. Harner, Stevens Avenue Pump Station has a bar screen in the diversion chamber. The on-site vortex separator was built in the early 1970s to remove solids and floatables from CSO overflows. The City does not chlorinate the CSO overflows. At the time of the inspection the

pump station was under construction and is expected to be completed by 2013. Lancaster is converting to automatic bar screen.

G. NMC #7: Pollution Prevention

Part C, Subsection V. of Lancaster's NPDES permit requires as part of the NMCs implementation of pollution prevention programs to reduce contaminants in CSOs:

- 1. The City shall continue its goal of sweeping each street approximately every two weeks as a minimum.*
- 2. Inlets and catch basins are to be checked and cleaned if necessary, at least twice a year, especially before and after heavier rainfalls.*

According to Mr. Harner, Lancaster's catch basin cleaning procedure is to sweep the streets before cleaning inlets, then they pull the grate, vacuum any debris out, inspect, pressure wash the basin and refill with water to see if it holds water. Work orders are issued for any catch basins that need to be repaired. The City can clean and inspect eight catch basins in a day. The City has a total of 2,200 catch basins in its service district and has one or two crews a day working. The City has two vacuum trucks and they are used five to seven days a week. Other pollution prevention actions include household hazardous waste collection days and recycling. The City has a website where they encourage all residents and business to implement pollution prevention practices to reduce impacts to the environment.

<http://www.cityoflanasterpa.com/lanastercity/cwp/view.asp?A=954&Q=538639>

H. NMC #8: Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts

During the inspection, City staff stated that four of the five CSO outfalls also serve as MS4 outfalls because the City's MS4 is connected to the CSO outfall pipe prior to the actual discharge point. Therefore, it might not be clear whether a discharge during dry weather is associated with the CSS or with the MS4. The signs posted at the Chesapeake and Strawberry CSOs (003 and 006, respectively) state: "In case of dry weather discharge, please notify the City Waste Water Bureau @ 717-293-5533."

The City did not describe other mechanisms for public notification regarding CSO impacts (e.g., notification signs posted after CSO discharge events or DWOs). The EPA Inspection Team conducted a brief review of the City's website and observed that the website includes some background information about the CSS and CSOs; however, it was unclear to the EPA Inspection Team whether the City uses the website to post notices regarding CSO impacts.

I. NMC #9: Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Control

Lancaster recently revised and developed 16 new SOPs, which includes response to sewer overflows and basement backup complaints. These SOPs were developed over a three-month period since the last EPA inspection. Lancaster's SOP for domestic wastewater outdoor spills includes notifying the Pennsylvania Department of Environmental Protection (PADEP) hotline within 24-hours. However, it does not include a determination of the impact to the environment and procedures for calculation of spill/release volume and time frame of event.

V. ADDITIONAL OBSERVATIONS

A. Tour of the ATWP

According to Mr. Connell, Lancaster received bids for work on the AWTP that includes two screening channels with mechanical screens and two vortex type grit removal systems for the North Train and two vortex type grit removal systems for the South Train. The work will also include activities in the existing Screen House building located in the South Train and three influent pumps, some demolition and structural improvements inside the building, and installation of a new grit washer. Work is expected to be completed sometime in 2013.

At the time of the inspection, one of the two primary clarifiers for the North Train was out of service (#5). According to Mr. Dickel, Clarifier 5 has been out of service for three to four months because it needs a new skimmer arm. The primary clarifier was out during the previous EPA inspection. During that inspection the clarifier was filled with grit. Each clarifier has 54 MGD capacity. The two primary clarifiers have roofs originally for odor control. Mr. Connell stated that wastewater flows receive primary treatment at the North and Stevens Avenue Pump Stations, but there is no additional screening and grit removal in the North Treatment Train at this time.

Mr. Dickel stated that following primary clarification, both the North and South Trains use Kruger OASES high purity oxygen activated sludge process to further remove organic material as well as nutrients. The treatment process uses a combination of anaerobic, oxic and anoxic conditions to achieve nitrogen and phosphorus removal from the wastewater. The tanks are covered to create these various conditions by either keeping oxygen away from the activated sludge or keeping a high purity oxygen atmosphere trapped. Vertical shafted mixers keep the activated sludge thoroughly mixed, while surface aerators are used to help add the oxygen to the activated sludge. The North Train has four units and the South Train has three units.

From the biological treatment units the wastewater flow goes to the final clarifiers. There are three 150-foot diameter final clarifiers for the North Train, approximately 2 million gallons per tank and two 100-diameter final clarifiers for the South Train are used to separate the mixed liquor and suspend solids. From the North Train a 36-inch pipe conveys the treated wastewater to the chlorine contact tanks. A gas chlorination system is used for disinfection of the treated effluent. For both treatment trains there are four chlorine contact tanks with a residence time of 45 minutes to 1 hour.

According to Mr. Connell, the AWTP has four filter presses that remove 20 to 22% solids and with the addition of lime this is increased to 26 to 27% for both treatment trains. Sludge from the AWTP goes to mine reclamation and land application sites.

The South Treatment Train receives flow from the Maple Grove and Engleside Districts. At the headworks flow goes through screening and grit removal and into four primary tanks. Part C, Subsection V. of Lancaster's NPDES permit states, *A CSO-related bypass (Outfall 100) of the secondary treatment portion of the POTW treatment plant's South train as a result of a precipitation event exceeds 7.0 MGD average daily flow. In the event of a CSO-related bypass authorized under this condition, the permittee shall minimize the discharge of pollutants to the environment and attempt to capture the "first flush." At a minimum, CSO-related bypass flows must receive primary clarification, solids and floatables removal, and disinfection.* Mr. Connell stated during wet weather events the AWTP can handle up to 27 MGD, but then they have to bypass from the South Train that combines with the fully treated wastewater from the North Train prior to reaching the Conestoga River. Mr. Connell went on to say that the CSO-related bypass at the AWTP is in accordance with the permit requirements.

According to Ms. Katzenmeyer, in 2010 Lancaster had exceeded nutrient levels based on flow through the AWTP due to increased precipitation during the year. Also, new permit limits for ammonia nitrogen was reduced from 8.0 to 7.5 mg/L for the monthly average from November to April. As a result, Lancaster through its inter-municipal agreements, borrowed 10,000 credits from Lancaster Area Sewer Authority to meet its permitted waste load allocation.

From June 2008 to November 2011, Lancaster has had 30 effluent limitation violations (see Table 1). EPA asked about effluent limit violations. According to Mr. Connell the chlorine and total suspended solids violations were a result of freezing of material in the chlorine contact tanks. Also the violations were a result of storm events impacting the AWTP. Lancaster had a total of eight Total Residual Chlorine violations. At this time, PADEP has not issued any enforcement orders or correction actions to prevent future effluent violations.

Table 1: Effluent Violations

Date	Parameter	Reported Value/Units	Limit Value/Units	% Exceeded
June 2008	Total Suspended Solids	67 mg/L	45 mg/L (Weekly Ave)	49%
June 2008	Total Suspended Solids	36 mg/L	30 mg/L (Monthly Ave)	20%
September 2008	Ammonia-Nitrogen	2.78 mg/L	2.5 mg/L (May – Oct)	11%
February 2009	Total Suspended Solids	57 mg/L	30 mg/L (Monthly Ave)	90%
February 2009	Total Suspended Solids	17,693 lb/d	12,040 lb/d (Daily Max)	90%
February 2009	Total Suspended	8,665 lb/d	8,026 lb/d (Monthly	8%

Date	Parameter	Reported Value/Units	Limit Value/Units	% Exceeded
	Solids		Ave)	
February 2009	Total Suspended Solids	111 mg/L	45 mg/L (Weekly Ave)	147%
March 2009	Total Suspended Solids	75 mg/L	45 mg/L (Weekly Ave)	67%
March 2009	Total Suspended Solids	42 mg/L	30 mg/L (Monthly Ave)	40%
April 2009	Total Phosphorus	2.2 mg/L	2 mg/L (Monthly Ave)	10%
April 2009	Total Suspended Solids	87 mg/L	45 mg/L (Weekly Ave)	93%
April 2009	Total Suspended Solids	50 mg/L	30 mg/L (Weekly Ave)	67%
April 2009	Total Suspended Solids	14,554 lb/d	12,040 lb/d (Daily Max)	21%
April 2009	Total Suspended Solids	8,474 lb/d	8,026 lb/d (Monthly Ave)	6%
September 2009	Fecal Coliform (May – Sept)	204 cfu/100 ml	200 cfu/100 ml	2%
May 2010	Fecal Coliform (May – Sept)	237 cfu/100 ml	200 cfu/100 ml	19%
October 2010	Total Residual Chlorine	0.47 mg/L	0.42 mg/L	12%
December 2010	Total Residual Chlorine	0.47 mg/L	0.42 mg/L	12%
January 2011	Total Suspended Solids	77 mg/L	45 mg/L (Weekly Ave)	71%
January 2011	Total Suspended Solids	41 mg/L	30 mg/L (Monthly Ave)	37%
February 2011	Total Phosphorus	2.49 mg/L	2 mg/L	2%
February 2011	Total Suspended Solids	61 mg/L	45 mg/L (Weekly Ave)	36%
February 2011	Total Suspended Solids	42 mg/L	30 mg/L (Monthly Ave)	40%
March 2011	Total Residual Chlorine	0.68 mg/L	0.42 mg/L	62%
April 2011	Total Residual Chlorine	0.44 mg/L	0.42 mg/L	5%
May 2011	Total Residual Chlorine	0.69 mg/L	0.42 mg/L	64%

Date	Parameter	Reported Value/Units	Limit Value/Units	% Exceeded
June 2011	Total Residual Chlorine	0.67 mg/L	0.42 mg/L	60%
September 2011	Total Fecal Coliform	376 cfu/100 ml	200 cfu/100 ml	88%
October 2011	Total Residual Chlorine	0.46 mg/L	0.42 mg/L	10%
November 2011	Total Residual Chlorine	0.48 mg/L	0.42 mg/L	14%

B. Tour of the Collection System

On December 7, 2011, EPA visited Franklin and Marshall College to view a porous pavement parking lot and three green roofs. The College is located outside of the combined collection sewer system. Ms. Katzenmeyer did not know the volume of stormwater prevented from going into the separate stormwater system. The parking lot was installed in the summer of 2010 and is cleaned every six months.

EPA visited a green alley that was under construction. The center of the alley was porous and stormwater would flow from the sides to the middle of the alley. This project was located outside of the combined collection system and was a supplemental environmental project as a result of an EPA Administrative Penalty Action for stormwater violations.

EPA visited the Engleside Diversion Chamber, which is located in the combined collection system. The flows from Engleside flow into the South Train at the AWTP. According to Mr. Dickel the design flow to the plant is almost 19.5 MGD from the South Train. Lancaster recently installed new screens to reduce the amount of grit going to the AWTP. However, according to Mr. Dickel, there are no solids and floatable controls at the Diversion Chamber that discharge out through the CSO outfall. EPA asked about the solids and floatable controls at the Susquehanna and Strawberry CSO outfalls. According to Mr. Dickel the Susquehanna Pump Station has no solids and floatable controls on the diversion structure that discharge out of or through the CSO outfall. According to Ms. Katzenmeyer, the solids and floatable controls are street and catch basin cleaning. EPA asked about the solids and floatables that are discharged into the collection system from municipal or industrial users that have the potential to be discharged out through the CSO outfalls during wet weather. Ms. Katzenmeyer never answered EPA's question. Clay Street outfall also does not have solids and floatable controls.

EPA visited the Stevens Avenue Pump Station. The Stevens Avenue Pump Station is under construction to increase its maximum flow capacity from a maximum of 8.9 MGD to 11.9 MGD by December 2012. Mr. Harner stated that the pumps at Stevens Avenue needs more horsepower to get flows into the interceptors during high flows. All the pumps are being replaced to give Lancaster more flexibility for pumping. A backup generator is also being constructed and screening will be installed before the vortex swirl concentrator to remove solids

and floatables from the CSO outfall. The pump station lacks grit removal capability. This means the solids from the North and Stevens Avenue pump stations may directly impact the ability of the North Treatment Train at the AWTP to perform efficiently.

C. Capital Improvement Projects

The Stevens Avenue Pump Station is being expanded to meet expected growth. According to Mr. Dickel, the North and Stevens Avenues pump stations share a common three-mile force main. EPA asked if Lancaster has evaluated the sewer line to determine if can handle the additional capacity. Mr. Harner stated the maximum velocity will increase from 8 to 9 feet per second. Lancaster plans to evaluate the force main and will monitor with ultrasound to test pipe thickness and may have to replace part of the sewer line if necessary. At the time of the inspection, there was no time frame to evaluate the force main.

According to Mr. Harner, Lancaster is also planning to upgrade other pump stations. The North Avenue Pump Station capacity is expected to be increased from 26 MGD to 43 MGD at a cost of 11.3 million. The expansion includes a new generator and is expected to be completed by 2014. Lancaster is planning to install screening and grit removal but lacks funding. According to Ms. Katzenmeyer, the screening and grit removal will have to wait until the City issues another bond or they might find funding from its satellite partners. However, there was time frame for the installation of the screening for grit removal. During the last inspection, the grit removal system at the North Pump Station was out of service, and a heavy accumulation of rags and debris was observed within the pump station.

The backup power generator for the City's North Pump Station also provides power to the nearby Grofftown Pump Station; however, the backup generator does not provide enough power to run all the pumps at both pump stations simultaneously and would therefore not provide the City with its maximum pumping capacity. The new generator is expected to alleviate this problem. Also, Manheim Township sends an unknown amount of MS4 flow to the North Pump Station. Lancaster needs to evaluate the MS4 flow to the pump station and eliminate it to reduce the volume and frequency of CSO overflows, maximize flow to the WWTP, and maximize storage in the collection system. Mr. Harner stated that the solution to this problem is to have Manheim build a pump station that would send the stormwater to the Conestoga River. PADEP stated that they plan to work with Manheim to have the stormwater removed from the collection system. Also, the school district has a groundwater source that goes to the North Pump Station. Lancaster is hoping to address this with green infrastructure; however, there was no discussion of the removal of this groundwater in the GI Plan.

Mr. Harner stated Lancaster also plans to upgrade the Conestoga Garden Pump Station from 6.83 MGD to 8.4 MGD and the Maple Grove Pump Station from 8 MGD to 9.1 MGD. Both of the pump stations are located in the separate collection system. The increased capacity at these pump stations are a response to growth. Ms. Katzenmeyer stated that they will meet with its satellite partners to discuss funding.

D. Green Infrastructure

Ms. Katzenmeyer stated that approximately 32% of the City had impervious surface. The City plans to complete six green infrastructure (GI) projects within the next year, which includes retrofitting several public parking lots. The street and park departments will have a budget for operation and maintenance of these stormwater controls. This includes a contractor with a vacuum truck sweeper to clean the porous pavement. EPA asked about the lifecycle of the porous pavement parking lots. Ms. Katzenmeyer replied about 20 years.

EPA asked how the City expects to manage the GI on private property. The City will develop landowner agreements for O&M on private property. If the private landowner does not maintain its GI, a lien will be placed on the property. Also, the City is evaluating a stormwater fee, which is expected to be presented to City Council.

Brandon Park, located at Hazel Street and Wabank Road, has bioretention, porous pavement parking stalls, porous pavement playing court, and vegetative swales. According to Ms. Katzenmeyer, this site prevents 5,000,000 gallons of stormwater a year from going into the combined collection system. EPA asked if this can be verified with a hydraulic model. Ms. Katzenmeyer stated that the hydraulic model should verify the amount of stormwater prevented from entering the collection system for most GI projects, including the porous pavement public parking lots. Lancaster's hydraulic model is expected to be completed by March 2013.

Crystal Park, located at 1st Street and Reiker Avenue, has a porous pavement basketball court that captures upland stormwater flow from a parking lot and roof tops. This site is expected to capture 750,000 gallons of stormwater a year.

On the 600 block of South Plum Street, the City will install porous pavement in the stalls in a public parking lot with a rain garden to take the extra flow. Under the porous pavement is gravel for subsurface infiltration. According to Ms. Katzenmeyer, this site is expected to capture 748,000 gallons a year.

On the 400 block of East Mifflin Street, the City is designing a public parking that will be retrofitted with a bioretention area to capture runoff from the lot. This will include a rain garden to capture excess flow from the lot.

The City plans to install a bioretention garden on a public parking lot located on the 200 block of Dauphin Street that will capture runoff. A combination bioretention garden and infiltration bed will capture runoff from the Dauphin Street and Lime Street entrances. The existing public parking lot on the 500 block will also be retrofitted with a subsurface infiltration and storage bed.

EPA evaluated a private green roof at the National Novelty Brush Company (NNBC) located at 505 East Fulton Street. NNBC bought abandon row houses to build new warehouse, but did not have enough room to build storm water basin to address runoff, so they decided to build a green roof. The 16,900 square feet roof is designed to handle one inch of rain. According to Richard Seavey, CEO NNBC, the roof keeps the building 10⁰F cooler in the summer and the property no longer floods when it rains. The roof is planted with eight species of sedums and requires weeding, some nutrients once a year and watering in the summer. Mr. Seavey stated that when

he first proposed the green roof to the City's zoning board, they were very skeptical and he had to educate them at the time. EPA asked if he is involved in the City's current GI Plans. Mr. Seavey stated he hasn't worked with the City, NNBC got into the City's GI plan by default. At the time of the inspection, there are seven green roofs in the City for a total of 51,385 square feet.